

Kubernetes Architecture



- A Cluster = 1 Master Node + Multiple Worker Nodes
- Master Node: Controls and manages the cluster
- Worker Nodes: Where your app (containers) actually run.



MASTER NODE COMPONENTS



API Server

- It is the front door of the Kubernetes cluster.
- Every command or request (like `kubectl get pods`) goes through the API Server.
- It validates, processes, and sends the request to the right component.



etcd

- It is the key-value database of the entire cluster.
- Stores configuration, cluster state, secrets, etc.
- If etcd crashes, Kubernetes loses memory of everything.



Controller Manager

- Ensures that the cluster is in the desired state.
- Example: If 3 pods are needed, and only 2 are running, it will create the 3rd.
- Works like a watchdog in the background.



Scheduler

- Decides which node will run the new Pod.
- Checks available resources (CPU, RAM, etc) and schedules pods smartly.



WORKER NODE COMPONENTS



kubelet

- Agent running on every worker node.
- It talks to the Master and runs the assigned pods.
- Checks if the pod is healthy or crashed.



kube-proxy

- Manages networking and routing inside the cluster.
- Ensures traffic reaches the correct pod inside the node.

